Paper No. 37

UNITED STATES PATENT AND TRADEMARK OFFICE
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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte JEREMY S. MORRIS
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Appeal No. 1997-2406
Application 08/170,651[1]
_____

ON BRIEF
_____

Before HAIRSTON, KRASS and FLEMING, *Administrative Patent Judges*.

FLEMING, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 1, 3 through 10, 13 and

16 through 18, all of the claims pending in the present application.

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[1] Application for patent filed December 20, 1993. According to Appellant, this application is a continuation of Application 07/724,555, filed June 28, 1991, now abandoned.

The invention relates to computer rendition of images of objects in three-dimensional

space in a two-dimensional array that improves antialias filtering. In particular, Appellant

discloses on page 3 of the specification that N offset sampling points are determined so that

substantially N times oversampling is applied based on a class of image feature. Appellant

discloses that the N sample points may be a regular two-dimensional array whose principal

axes are not aligned with the principal axes of the pixel array. Alternatively, the sub-pixel array

of sample points may constitute a non-regular two-dimensional array. See page 3 of the

specification. Appellant discloses where the array of sample points may be determined as

having a bias toward the periphery of the pixel area. In each case, an overall benefit in aliasing

effects is obtained.   Further, three-dimensional objects are represented by primitive data which

comprise geometric and surface descriptions of a plurality of image primitives which make up

the objects. See page 4 of the specification.

The independent claim 1 is reproduced as follows:

1.   A method of generating, from primitive data comprising geometric and surface
descriptions of a plurality of image primitives, an image of objects in a three dimensional space
constituted by a regular, two dimensional filtered pixel array having two principal axes, the
method comprising:

using the primitive data to form N renditions comprising respective N intermediate pixel
arrays obtained by imposing respective N different offsets between the primitives and a sample
point for each pixel of said filtered pixel array, said N different

offsets defining a basic array of N sample points distributed substantially over the area of a pixel of said filtered pixel array, which basic array of N sample points is applicable to each pixel of said filtered pixel array; and

combining the N intermediate pixel arrays to generate said filtered pixel array constituting an image which has been oversampled and filtered;

wherein the N offsets are obtained by:

selecting a class of image feature for filtering; and

determining the locations of the N sample points of the basic array in dependence upon the selected class of image feature so as to ensure substantially N times oversampling of the selected class of image feature;

wherein the selected class of image feature comprises edges, which are nearly aligned with one of the other of the principal axes of the filtered pixel array, the locations of the N sample points in the basic array being chosen so as to divide the area of a pixel of the filtered pixel array at substantially N places in the direction of at least one of the principal axes of the filtered pixel array.

The Examiner relies on the following references:

Vreeswijk et al. (Vreeswijk)   5,043,810   Aug. 27, 1991

Appellant's admitted prior art (Appellant's spec. page 1, line 4 - page 3, line 5)[2]

Claims 1, 3 through 10, 13 and 16 through 18 stand rejected under 35 U.S.C.§ 103 as

being unpatentable over the admitted prior art and Vreeswijk.

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[2] Cook et al. (Cook) 2, 177,577A, United Kingdom patent application, filed June 1986. Henry Fuchs, et al.(Fuchs), "Fast Spheres, Shadows, Textures, Transparencies, And Image Enhancements In Pixel-Planes," 19 Computer Graphic , no. 3, 111-120 (July 22-26, 1985).

Rather than reiterate the arguments of Appellant and the Examiner, reference is made to

the briefs[3] and answer for the respective details thereof.

Opinion

We will not sustain the rejection of claims 1, 3 through 10, 13 and 16 through 18 under

35 U.S.C. § 103.

The Examiner has failed to set forth a ***prima facie*** case. It is the burden of the

Examiner to establish why one having ordinary skill in the art would have been led to the

claimed invention by the express teachings or suggestions found in the prior art, or by

implications contained in such teachings or suggestions. ***In re Sernaker***, 702 F.2d 989, 995,

217 USPQ 1, 6 (Fed. Cir. 1983). "Additionally, when determining obviousness, the claimed

invention should be considered as a whole; there is no legally recognizable 'heart' of the

invention." ***Para-Ordnance Mfg. v. SGS Importers Int'l, Inc.***, 73 F.3d 1085, 1087, 37

USPQ2d 1237, 1239 (Fed. Cir. 1995), ***cert. denied***, 519 U.S. 822 (1996) ***citing W.L.***

Gore & Associates., Inc. v. Garlock, Inc., 721 F.2d 1540, 1548, 220 USPQ 303, 309

(Fed. Cir. 1983), ***cert. denied***, 469 U.S. 851 (1984).

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[3]Appellant filed an appeal brief on August 8, 1996. Appellant filed a reply brief on December 9, 1996. The Examiner mailed a letter on January 15, 1997 stating that the reply brief has been entered and considered but no further response by the Examiner is deemed necessary.

On page 3 of the Office action of September 6, 1995 (Paper No. 27)[4], the Examiner's

rejection expresses that the admitted prior art teaches the image primitives comprise edges

which are nearly aligned with the principal axes of the filtered pixel array. Specifically, the

Examiner's rejection makes reference to the drawing in Figure 2 and the language in page 2,

lines 16-18 in the Appellant's specification. On page 4 of the same Office action, the

Examiner's rejection expresses that the admitted prior art method fails to disclose choosing N

sample points so as to divide the area of the pixel at substantially N places in the direction of at

least one of the principal axes of the filtered pixel array. The Examiner's rejection then applies

Vreeswijk as teaching this missing claimed limitation. The Examiner's rejection makes reference

to Vreeswijk, column 18, lines 53-56, and Figure 4B2. The Examiner's rejection states, "it

would have been obvious to one of ordinary in the art, at the time the invention was made, to

combine the teaching of Vreeswijk et al. to the admitted prior art technique to select a class of

image feature for filtering and adaptively use a sampling pattern of N sample points so as to

ensure substantially N times oversampling of the selected class of image feature."

On page 10 of the brief, Appellant argues that neither Vreeswijk, Fuchs, nor Cook

mentions any need to avoid artifacts produced by image edges nearly aligned with one or the

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[4]We note that the Examiner's Answer refers us to Paper Number 27. We note further that the
Final Action, mailed March 4, 1996, (Paper No. 29) refers us to the Office action, Paper Number 27.
We discourage this practice.

other of the principal axes of a pixel array. Appellant points out that Vreeswijk does not

mention that the Figure 4B2 column R pattern is useful for such artifact reduction. Further,

Appellant argues that a person of ordinary skill in the art of computer rendering of 3D images

represented by primitives would not look to Vreeswijk's HDTV art for pixel subsampling

patterns. Finally, Appellant argues that the Examiner has not demonstrated any basis for such

person to look to eliminate staircase artifacts produced by edges nearly aligned with a principal

axis of the pixel array by adjusting the subsampling pattern of Fuchs or Cook.

The Federal Circuit states that "[t]he mere fact that the prior art may be modified in the

manner suggested by the Examiner does not make the modification obvious unless the prior art

suggested the desirability of the modification." *In re Fritch*, 972 F.2d 1260, 1266 n.14, 23

USPQ2d 1780, 1783-84 n.14 (Fed. Cir. 1992), *citing In re Gordon*, 733 F.2d 900, 902,

221 USPQ 1125, 1127 (Fed. Cir. 1984).

Before we can address Appellant's arguments, we must first determine the scope of

Appellant's claim 1. "[T]he name of the game is the claim." ***In re Hiniker Co.***, 150 F.3d

1362, 1369, 47 USPQ2d 1523, 1529 (Fed. Cir. 1998). "Analysis begins with a key legal

question ***what*** is the invention ***claimed***? . . . Claim interpretation ... will normally control the

remainder of the decisional process." ***Panduit Corp. v. Dennison Mfg. Co.***, 810 F.2d 1561,

1567-68, 1 USPQ2d 1593, 1597 (Fed. Cir.), ***cert. denied***, 481 U.S. 1052 (1987). Claims

will be given their broadest reasonable interpretation consistent with the specification, and

limitations appearing in the specification are not to be read into the claims. ***In re Etter***, 756

F.2d 852, 858, 225 USPQ 1, 5 (Fed. Cir.) ***cert. denied***, 474 U.S. 828 (1985).

We note that claim 1 recites:

> determining the locations of the N sample points of the basic array in dependence upon
> the selected class of image feature so as to ensure substantially N times oversampling of
> the selected class of image feature; wherein the selected class of image feature
> comprises edges, which are nearly aligned with one of the other of the principal axes of
> the filtered pixel array, the locations of the N sample points in the basic array being
> chosen so as to divide the area of a pixel of the filtered pixel array at substantially N
> places in the direction of at least one of the principal axes of the filtered pixel array.

Upon a careful review of the admitted prior art, we agree with the Appellant that

neither Vreeswijk, Fuchs, nor Cook mentions any need to avoid artifacts produced by image

edges nearly aligned with one or the other of the principal axes of a pixel array. We agree with

the Examiner that the admitted prior art Figure 2 shows edges nearly aligned with a principal

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axis of the pixel. However, we fail to find where the admitted prior art teaches or suggests

obtaining sample points based upon the class of image feature in a manner that avoids artifacts

produced by image edges nearly aligned with one or the other of the principal axes of a pixel

array. We also agree with the Appellant that a person of ordinary skill in the art of computer

rendering of 3D images represented by primitives would not look to Vreeswijk's HDTV art for

pixel subsampling patterns. The Examiner has failed to show where the Vreeswijk reference

suggests the desirability of the modification over the problems encountered in the admitted prior

art.

With respect to claim 18, appellant argues that antialias filtering based on oversampling

of a pixel and carrying out of oversampling in dependence on edge orientation of the primitives

is not taught or suggested by the references for the same reasons as in arguments for claim 1.

We note that claim 18 recites "carrying out the oversampling in dependence upon edge

orientation of the specific one or more primitives." Like claim 1, the claim requires oversampling

by determination of sample points in dependence upon a class of image feature, e.g., edge

orientation. We find, as in claim 1, that neither the admitted prior art nor the Vreeswijk

reference teaches or suggests this limitation.

Upon review of the admitted prior art and the Vreeswijk reference, we fail to find any

teaching or suggestion to carry out oversampling by determining the locations of sampling points

in dependence upon a class of image feature, e.g., edge orientation of a primitive. Therefore,

we will not sustain the rejection of claims 1, 3 through 10, 13 and 16 through 18 under 35

U.S.C. § 103 as being unpatentable over the admitted prior art and Vreeswijk.

We have not sustained the rejection of claims 1, 3 through 10, 13 and 16 through 18

under 35 U.S.C. § 103. Accordingly, the Examiner's decision is reversed.

REVERSED

KENNETH W. HAIRSTON	)
Administrative Patent Judge	)
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	)
	) BOARD OF PATENT
ERROL A. KRASS	)
Administrative Patent Judge	) APPEALS AND
	)
	) INTERFERENCES
	)
MICHAEL R. FLEMING	)
Administrative Patent Judge	)

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